2.0 FLOODPLAIN DETERMINATION

Flood hazard areas were determined based upon the FEMA FIRM, found in Appendix A, and the FIS. Field visits in May 2010 were conducted to evaluate potential causes of flooding, flood zone properties, and accuracy of the FEMA maps. Photos are shown in Appendix B. Other sources, such as topographic mapping and aerial photos, were utilized in determining the degree of flooding, drainage tributary areas, and potential flooding risk. The updated Orange County FIS and FIRM are dated December 3, 2009. The FIS contains this notice:

> *NOTICE TO FLOOD INSURANCE STUDY USERS*
> *Communities participating in the National Flood Insurance Program has established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data. Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.*

As advised by FEMA, the OCFCD was consulted for accuracy of the FIRM maps, specifically Zone A designations (No BFE or depths determined). OCFCD staff have indicated that some FEMA floodplain delineations are not accurate. OCFCD has provided additional studies for waterways not conforming to the most recent FEMA FIRM maps. These are discussed in Section 3.1 for each waterway.

According to the Caltrans Standard Environmental Reference (SER), if there is no state or federal floodplain data available, the local agency or Caltrans is responsible for examining other data regarding recent flood locations and developing adequate information and analysis to support the conclusions presented in the technical report.

It is anticipated that there will be some floodplain encroachment throughout the corridor. Encroachment will vary at the each location depending on the proposed roadway improvement.

2.1 Extent of Floodplain Encroachment

In accordance with FEMA FIRMs, the following water bodies have been designated flood hazard areas. A composite floodplain map and FEMA maps are located in Appendix A and display areas with higher flood hazard, such as Zones A and AE.

Although detailed designs of I-405 flood control crossings have not been developed, the affected channels are expected to have minimal floodplain encroachments. Hydraulic modeling evaluating the effects of the proposed improvement areas (along with potential flood mitigation where necessary) would be required during the final design phase. Pursuant to State regulation, the bridges would be designed to have sufficient freeboard above the 100-year flood water surface elevations; therefore, the bridge deck would not impact flood flows.

The following identifies Flood Hazard Areas along the project corridor: The extent of floodplain encroachment will be discussed in their respective sections.

1. Delhi Storm Drain

The Delhi Storm Drain, also known as the Santa Ana Garden Channel, is shown on FIRM Map #06059C0267J and #06059C0259, December 3, 2009. The channel is designated as Zone A, and 100-year flood discharge is contained in the channel.

The I-405 Improvement Project would not impact the Delhi Storm Drain floodplain.

2. Greenville-Banning Channel D03

The Greenville-Banning Channel is shown on FIRM Map #06059C0258J, December 3, 2009. The channel is designated as Zone A, and 100-year flood discharge is contained in the channel.

Alternatives 1 and 2 would not impact the Greenville-Banning Channel. Alternative 3 would require extension of the existing triple 12-foot by 12-foot reinforced concrete box (RCB) crossing at the upstream end to accommodate the proposed widen roadway. Work would also include reconstruction of headwall and wingwall, and channel work.

According to the preliminary hydraulics analysis (Preliminary Bridge Hydraulics Report for Greenville-Banning Channel, Parsons, June 2010), the proposed action would have a

negligible amount of increase in water surface elevation and velocity. The culvert extension would not alter the existing floodplain.

3. Gisler Storm Channel

The Gisler Storm Channel is shown on FIRM Maps #06059C0258J and #C06059C0259J, December 3, 2009. The channel is designated Zone A, and 100-year flood discharge is contained in the channel.

Alternatives 1 and 2 would not impact the Gisler Storm Channel. Alternative 3 would have some roadway improvements that may impact the channel; however, the channel would be restored to its original state.

4. Santa Ana River

The SAR is shown on FIRM Map #06059C0258J, December 3, 2009. The SAR is designated as Zone A, and 100-year flood discharge is contained in the channel. The map also shows levee systems on both sides of the channel.

The adjacent lands are designated as Zone X (dotted). See FIRM maps regarding notes on levee system.

All of the build alternatives would have the same impact on the SAR. The proposed improvement is to widen the existing I-405 bridge over the river and add a new Euclid Street SB on-ramp bridge. Proposed improvements are shown in Appendix B.

According to the preliminary hydraulics analysis (Preliminary Bridge Hydraulics Report for Santa Ana River, Parsons, December 2009), the proposed improvements would cause a slight increase in water surface and velocities; however, normal depths would be reached shortly downstream on the proposed Euclid Street on-ramp bridge.

The 100-year floodplain would still be contained in the channel.

5. Fountain Valley Channel (D06)

The Fountain Valley Channel is shown on FIRM Map #06059C0254J, December 3, 2009. The channel is levied immediately upstream of I-405 and downstream, outside of Caltrans ROW. The channel is designated Zone A.

6. Ocean View Channel (C06)

The Ocean View Channel is shown on FIRM Maps #06059C0253J and #06059C0254J, December 3, 2009. The channel and adjacent lands are designated as Zone A north of I-405. The floodplain comingles with the East Garden Grove-Wintersburg Channel (EGGWC). The 100-year flows are contained in the channel downstream of the I-405.

7. East Garden Grove-Wintersburg Channel (C05)

The EGGWC is shown on FIRM Map #06059C0251J, December 3, 2009. The channel is levied downstream and upstream of I-405. The channel is designated as Zone A north and south of I-405, and it covers a considerably large area, including the Edinger Channel, Newland Channel, and Ocean View Channel. Residential areas are shown to be inundated by the 100-year storm.

According to the hydrology report for the EGGWC (Facility No. C05) Bolsa Chica Bay to Vermont Avenue, dated July 1990 by Environmental Management Agency, nearly the entire length of the EGGWC is deficient.

The I-405 Improvement Project proposes to widen the roadway over the channel. Bridges over the channel are proposed to minimize impacts to the channel. At the upstream end, it is proposed to construct a center pier hidden behind a retaining wall structure so that no bridge components would encroach on the channel. At the downstream end, it is proposed to construct a pier wall in line with the existing RCB walls.

OCFCD is currently studying the EGGWC at a regional scale. Several proposed structures, such as retention basins and channel widenings, are being considered to protect the area from potential flooding. Because the EGGWC system is very complex at the I-405 crossing, a physical model was constructed to depict actual field conditions. The physical model was completed in September 2010. OCFCD will use this information to develop a hydraulic model for EGGWC and its tributaries. Coordination with OCFCD for future phases of design shall be maintained to analyze the addition of piers.

8. Newland Storm Channel

The Newland Storm Channel is shown on FIRM Map #06059C0251J, December 3, 2009. The channel is designated as Zone A adjacent to I-405. According to OCFCD, the Newland Storm Channel is deficient. OCFCD is currently studying the channel and has plans for future improvements.

The I-405 Improvement Project would not impact the Newland Storm Channel.

9. Edinger Storm Channel (C05S05)

The Edinger Storm Channel is shown on FIRM Map #06059C0251J, December 3, 2009. The channel is designated as Zone A adjacent to I-405. The Edinger Storm Channel is currently in construction and will provide a 100-year level of protection. A new rectangular channel parallel to I-405 will be built, along with a new reinforced concrete pipe (RCP) under the freeway. Refer to the Edinger Improvement Plans, OCFCD 2009.

The I-405 Improvement Project would not impact the Edinger Storm Channel floodplain.

10. Westminster Channel (C04)

The Westminster Channel is shown on FIRM Map #060J9C0232J, December 3, 2009. The channel is designated as Zone A with some overtopping. The adjacent lands are designated as Zone X (dotted).

The I-405 Improvement Project would not impact the Westminster Channel floodplain.

11. Anaheim-Barber City Channel (C03)

The Anaheim-Barber City Channel is shown on FIRM Map #06059C0119J, December 3, 2009. The channel is designated as Zone A, and the 100-year flood discharge is contained in the channel.

The I-405 Improvement Project would not impact the Anaheim-Barber City Channel

12. Bolsa Chica Channel (C02)

The Bolsa Chica Channel is shown on FIRM Map #06059C0118J, December 3, 2009. The channel is designated as Zone A, and 100-year flows are contained in the channel. There is a

gap downstream of I-405 that is designated Zone D. East of the channel, the area adjacent to I-405 is designated as Zone X (dotted).

The I-405 Improvement Project would not impact the floodplain for the Bolsa Chica Channel.

13. Federal Storm Channel

The Federal Storm Channel is shown on FIRM Map #06059C0114J, December 3, 2009. The earthen channel downstream is designated as Zone D. The Old Ranch Golf Course Retarding Basin to the north is designated as Zone AE and outlets to the Federal Storm Channel. Flows from the retarding basin are metered out by a culvert under the freeway and outlets into an open earthen channel.

The I-405 Improvement Project would not impact the Federal Storm Channel floodplain.

14. Bixby Storm Channel (OCFCD Facility No. C01P04)

The Bixby Storm Channel is shown on FIRM Map #06059C0114J, December 3, 2009. The channel is designated as Zone A. The map shows that the 100-year flood discharge is contained in the trapezoidal concrete channel. The adjacent lands are designated as Zone X (dotted), protected by levees from 1 percent annual chance flood. Although there are no BFEs shown on the FEMA map, a recent hydrology study, Bixby Channel Diversion Drainage Study for the WCC Project (AECOM, August 2009), indicates that the 100-year flows overtop the existing channel. No floodplain delineations were modeled.

The WCC Project proposes to widen Bixby Channel because it will redirect approximately 15.8 acres to the Bixby Channel watershed. The existing trapezoidal channel will be reconstructed as a rectangular channel. The post-project condition 100-year discharge will still overtop the channel because the outlet at the Montecito Storm Channel controls the hydraulic system. In an agreement with OCFCD and OCTA, a new bypass channel for Bixby Channel would be constructed as part of the I-405 Improvement Project that would capture the 100-year discharge and alleviate additional flow on the Montecito Storm Channel.

15. Montecito Storm Channel (OCFCD Facility No. C01S03)

The Montecito Storm Channel is shown on FIRM Map #06059C0114J, December 3, 2009. The channel is designated as Zone A. The map indicates that the 100-year flood discharge is contained in the channel.

3.0 RISK AND IMPACTS

Review of NFIP, field investigation, topographic mapping, and tributary drainage indicates that the proposed freeway widening would have very small to no significant risks to life and properties.

4.0 NATURAL AND BENEFICIAL FLOODPLAIN VALUES

According to the Santa Ana RWQCB's Basin Plan, the SAR is the only flood control facility that has natural and beneficial floodplain values.

The SAR outlets to the Pacific Ocean between Newport Beach and Huntington Beach. The Santa Ana RWQCB designates beneficial uses for waters in the SAR Watershed, which are identified in the Basin Plan (RWQCB 1995). The beneficial uses that have been identified for Reaches 1 and 2 of the SAR are as follows:

- Municipal and Domestic Supply – Waters are used for community, military, municipal, or individual water supply systems. These uses may include, but are not limited to, drinking water supply.
- Wildlife Habitat – Uses of water that supports terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
- Warm Freshwater Habitat – Maintenance of warm water ecosystems.
- Body Contact Recreation – Recreational activities involving body contact with water.
- Non-Body Contact Recreation – Recreational activities involving proximity to water, but generally no body contact or ingestion of water.

5.0 PROBABLE INCOMPATIBLE FLOODPLAIN DEVELOPMENT

It is determined that floodplain encroachments would not adversely affect the BFEs.

Every effort will be made so that the project remains compatible with the NFIP of FEMA.

6.0 MEASURES TO MINIMIZE IMPACTS

The following measures will be incorporated into the design and construction phases to minimize potential floodplain impact:

- Provide positive drainage during construction and refrain from diverting flows.
- Employ recommended Best Management Practices (BMPs)
- In-river construction and post construction shall include erosion control and water quality protection.
- A contingency plan shall be developed for unforeseen discovery of underground contaminants.
- Construction activities between October and May shall be limited to those actions that can adequately withstand high flows and entrainment of construction materials.
- Adequate conveyance capacity will be provided at bridge crossings to ensure no net increase in velocity.

7.0 PRACTICABILITY OF ALTERNATIVES

Because the proposed work is located in an existing highway, a new highway location alternative cannot be evaluated. The proposed work would widen the existing freeway to accommodate HOV lanes. The only variable to the impacts is the degree of encroachment. Disturbance to the floodplains shall be minimized as much as possible.

The proposed action conforms to applicable State or local floodplain protection standards.

8.0 FUTURE CONSIDERATION

Per FHWA Sec 650.115 Design Standards Guidelines, design of highways:

1. The design selected for an encroachment shall be supported by analyses of design alternatives with consideration give to capital cost and risk, risk analysis or assessment

2. The design flood for encroachments by through lanes of Interstate highways shall not be less than the flow with a 2 percent chance of being exceeded in any given year. No minimum design flood is specified for Interstate highway ramps and frontage roads or for other highways

3. Freeboard shall be provided, where practicable, to protect bridge structures from debris- and scour-related failure.

9.0 EVALUATION CRITERIA

A summary of the evaluation criteria is provided in Table 1. This table indicates that the I-405 Improvement Project would have no material effect on natural and beneficial floodplain values or incompatible floodplain development, and it would not create a high-risk condition.

Channel Name	Q 100 year (cfs)**	Type of Encroach-ment	Effects on Natural Beneficial Values	Effects on Incompatible Development	High Risk		
					Alt. 1	Alt. 2	Alt. 3
Delhi Storm Drain	Unknown+	Transverse	None	None	N/A	N/A	N/A
Gisler Storm Channel*	Unknown+	Transverse	None	None	N/A	N/A	No
Mesa Verde Storm Drain	Unknown+	Transverse	None	None	N/A	N/A	N/A
Greenville-Banning Channel (D03)	3,450	Transverse	None	None	N/A	N/A	No
Hyland Avenue Storm Drain	370	Transverse	None	None	N/A	N/A	N/A
Santa Ana River	47,000	Transverse	None	None	Moderate		
Fountain Valley Channel (D06)	172	Transverse	None	None	No	No	No
Ocean View Channel (C06)	1,930	Transverse	None	None	No	No	No
East Garden Grove-Wintersburg Channel (C05)	5,910	Transverse	None	None	No	No	No
Newland Storm Channel	1,080++	Transverse	None	None	No	No	No
Edinger Storm Channel* (C05S05)	Unknown+	Longitudinal	None	None	No	No	No
Westminster Channel* (C04)	4,190	Transverse	None	None	No	No	No

Channel Name	Q 100 year (cfs)**	Type of Encroach-ment	Effects on Natural Beneficial Values	Effects on Incompatible Development	High Risk		
					Alt. 1	Alt. 2	Alt. 3
Anaheim-Barber City Channel (C03)	7,450	Transverse	None	None	N/A	N/A	N/A
Milan Storm Drain	Unknown+	Transverse	None	None	No	No	No
Bolsa Chica Channel (C02)	4,100	Transverse	None	None	N/A	N/A	N/A
Federal Storm Channel	332	Transverse	None	None	No	No	No
Bixby Storm Channel*	203	Longitudinal	None	None	No	No	No
Montecito Storm Channel	410	Transverse	None	None	No	No	No

* Runs parallel to I-405 freeway
**Source of information is from OCFCD Hydrology Reports
+ No data available
++1,080 cubic feet per second (cfs) Estimated Peak 100-year flow and 550 cfs Channel Capacity
RCB – reinforced concrete box; RCP – reinforced concrete pipe
N/A – No floodplain Impacts.

10.0 REFERENCES

1. Flood Insurance Rate Maps, Various, by the Federal Emergency Management Agency.

2. Montecito Channel Hydrology Report No C01-3.

3. Bixby Channel Hydrology Report No C01-S04.

4. Hydrology Report for Los Alamitos Channel.

5. Hydrology Report No. C02-4A, Bolsa Chica Channel (C02) San Diego Freeway to Cerritos Avenue, dated January 1997, by Orange County Public Facilities and Resources Department.

6. Hydrology Report No. C03-4, Anaheim-Barber City Channel Facility No. C03 Entire Drainage System, dated September 1986, by Orange County Resources and Development Management Department.

7. Hydrology Report No.C04-4, Westminster Channel (Facility No. c04) Entire Drainage System Hydrology, dated December 2002, by Orange County Public Facilities and Resources Department.

8. Hydrology Report – Newland Storm Channel Facility No. C05S01, dated August 2005, by Orange County Resources and Development Management Department.

9. Hydrology Report for East Garden Grove-Wintersburg Channel (Facility No. C05) Bolsa Chica Bay to Vermont Avenue, dated July 1990, by Environmental Management Agency.

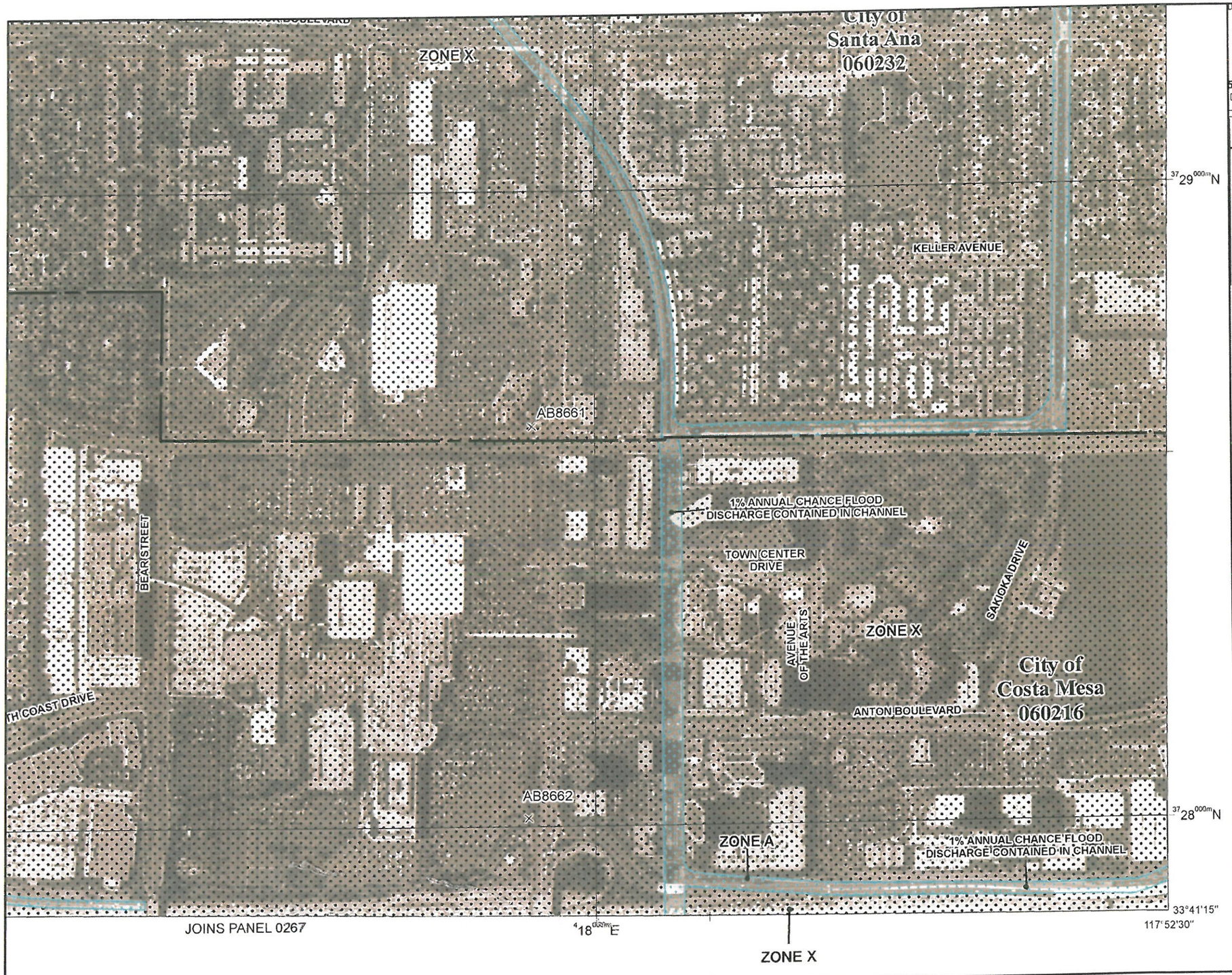
10. Hydrology Report No. C06-2, Ocean View Channel, Facility No, C06, Entire Drainage System, dated November 1989, by Environmental Management Agency.

11. The 100-year discharge is 47,000 cfs per "US Army Corps of Engineers, Design Flood Peak Dischargers, SAR, Future Conditions, "Santa Ana River Mainstem Phase II General Design."

12. Hydrology Report No. D03-4, Greenville-Banning Channel (Facility No. D03), dated June 1999, by Orange County Environmental Management Agency.

APPENDIX A

FEMA FIRM MAPS



dional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS

NFIP

PANEL 0259J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 259 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COSTA MESA, CITY OF	060216	0259	J
SANTA ANA, CITY OF	060232	0259	J

Notice to User. The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0259J

MAP REVISED
DECEMBER 3, 2009

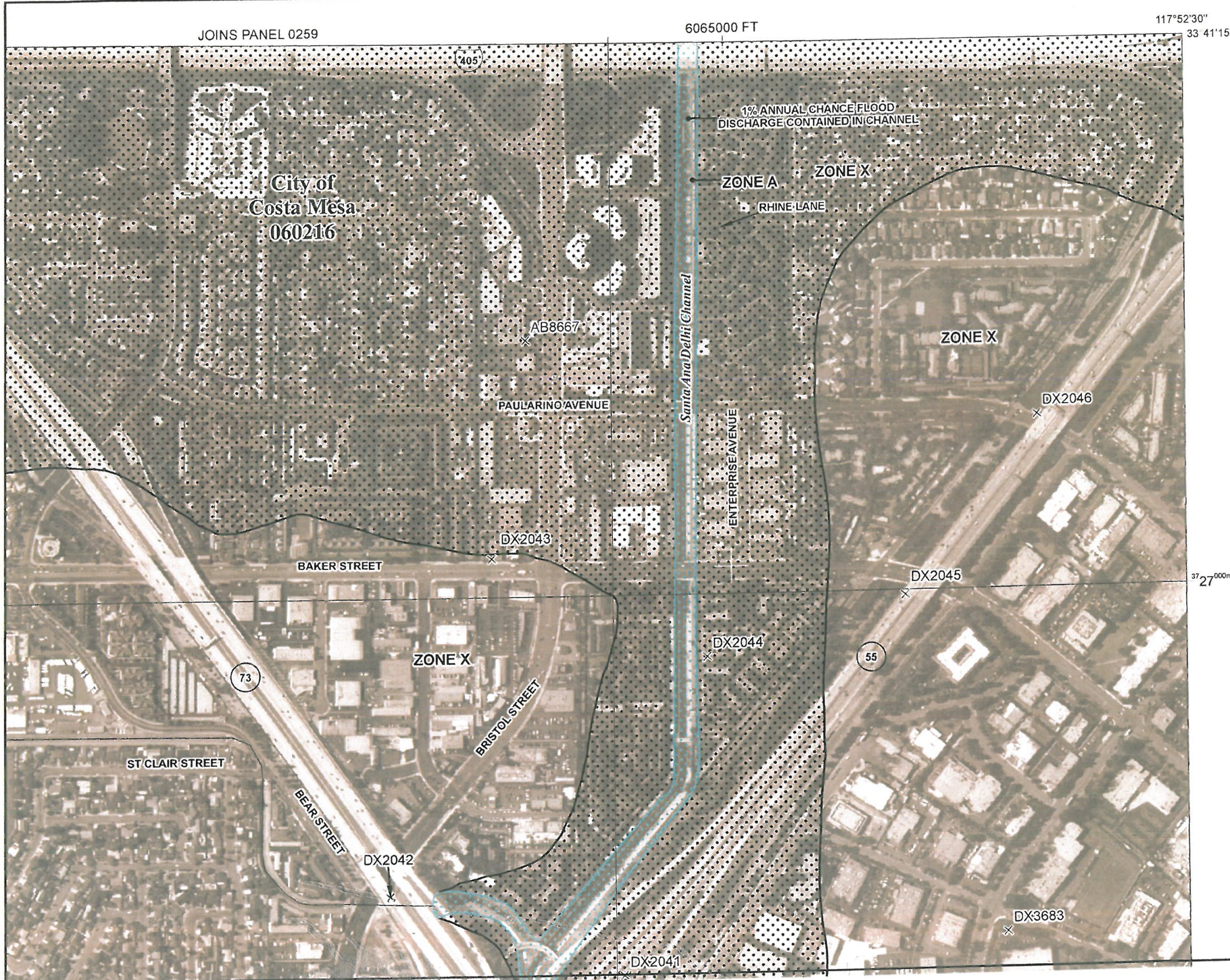
Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

DELHI CHANNEL

1 OF 2

ional Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0267J

FIRM
FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 267 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COSTA MESA, CITY OF	060216	0267	J
NEWPORT BEACH, CITY OF	060227	0267	J
ORANGE COUNTY	060212	0267	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0267J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

DELHI CHANNEL

2 OF 2

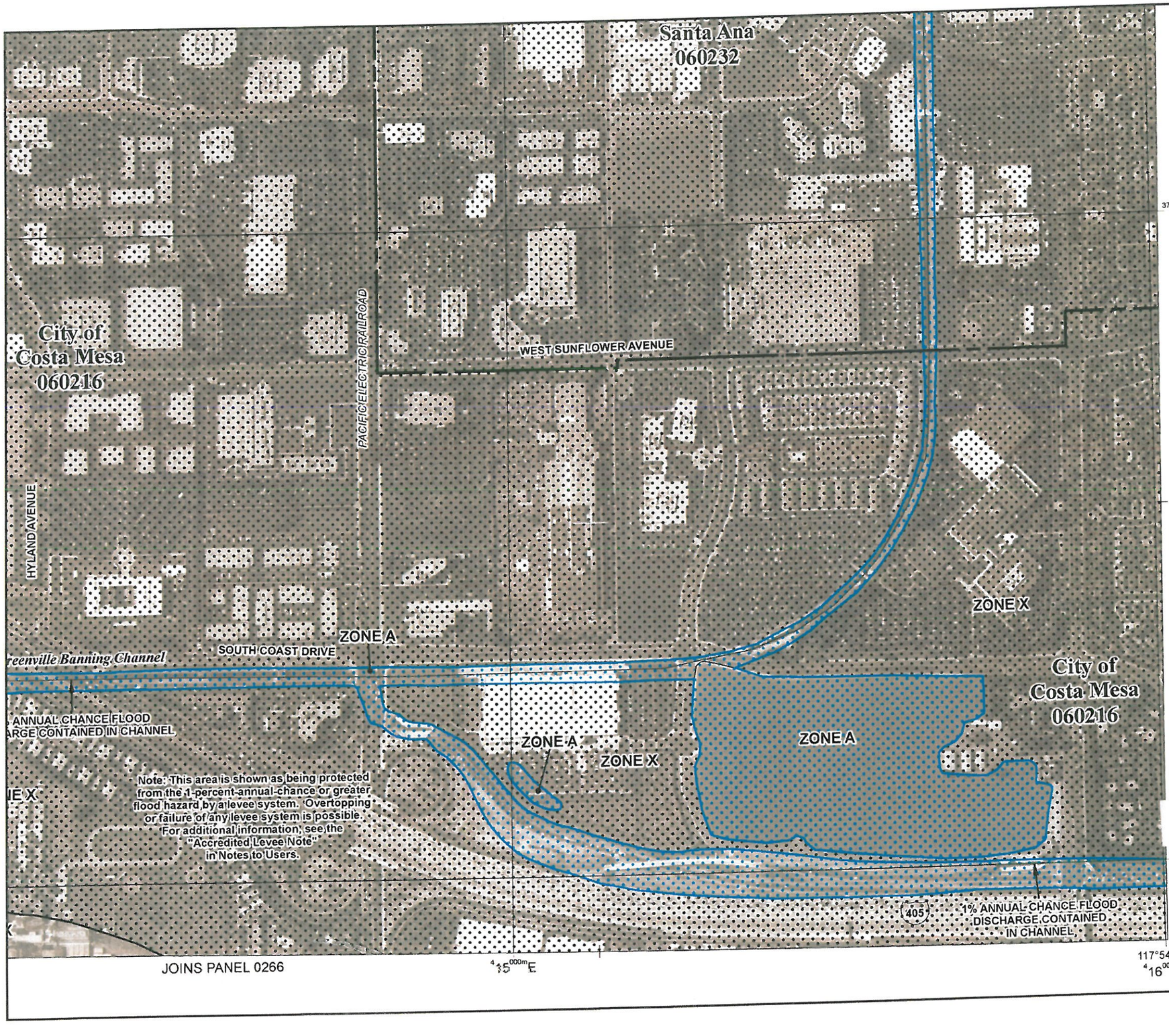
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0258J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 258 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COSTA MESA, CITY OF	060216	0258	J
FOUNTAIN VALLEY, CITY OF	060218	0258	J
SANTA ANA, CITY OF	060232	0258	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0258J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

GISLER STORM CHANNEL

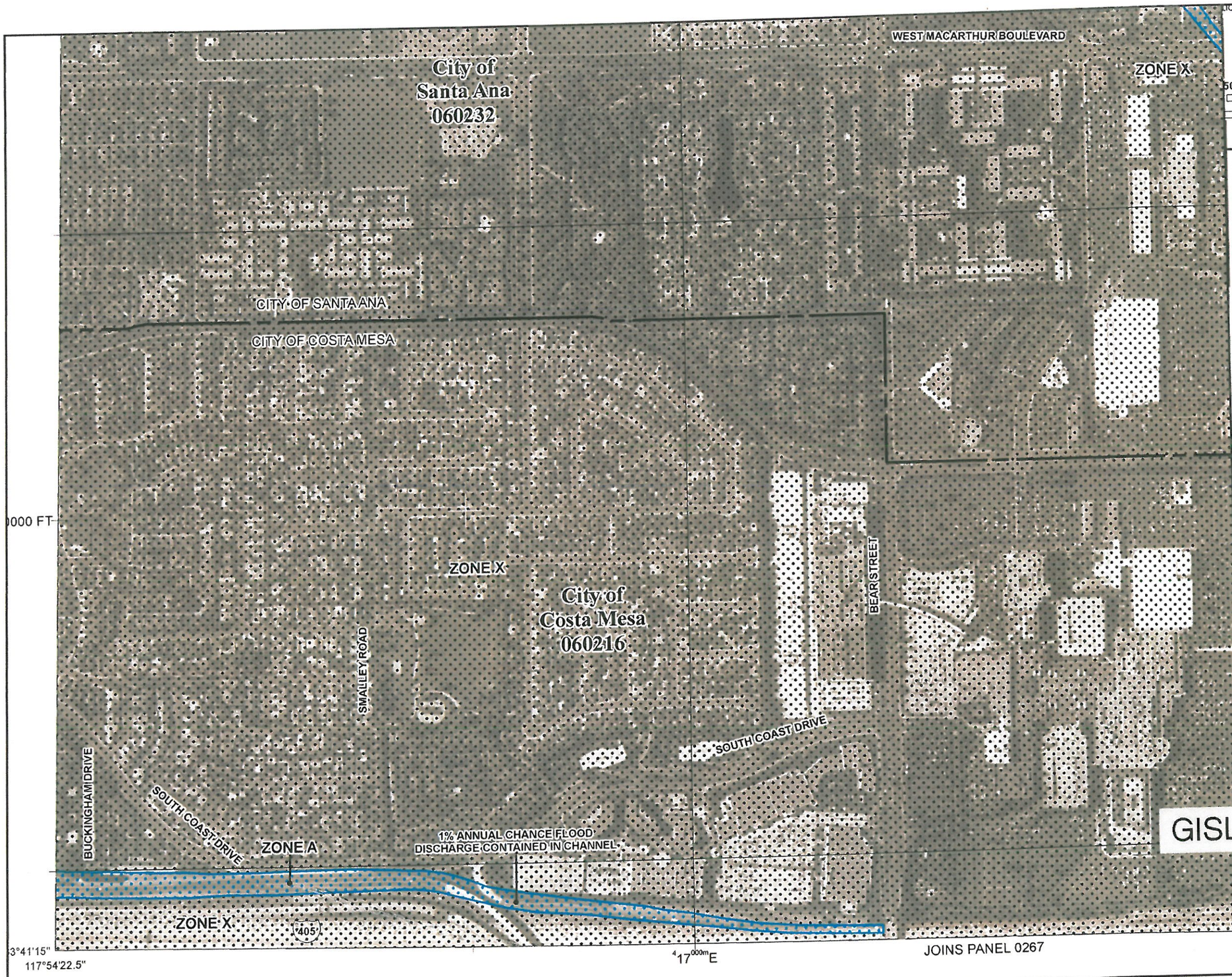
1 OF 2

ional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0259J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 259 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COSTA MESA, CITY OF	060216	0259	J
SANTA ANA, CITY OF	060262	0259	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 06059C0259J

MAP REVISED DECEMBER 3, 2009

Federal Emergency Management Agency

GISLER STORM CHANNEL

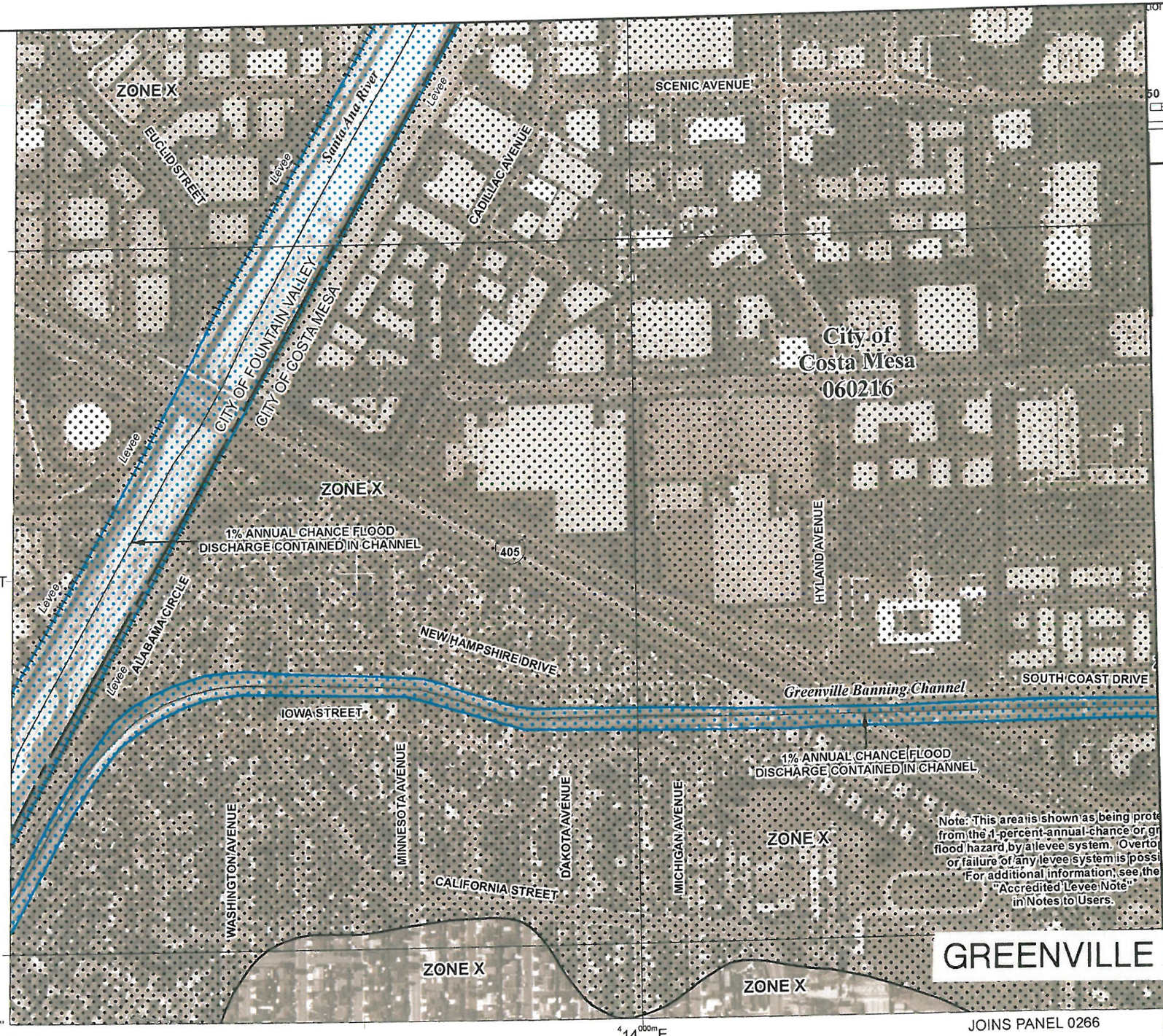
2 OF 2

tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0258J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 258 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COSTA MESA, CITY OF	060216	0258	J
FOUNTAIN VALLEY, CITY OF	060710	0258	J
SANTA ANA, CITY OF	060212	0258	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

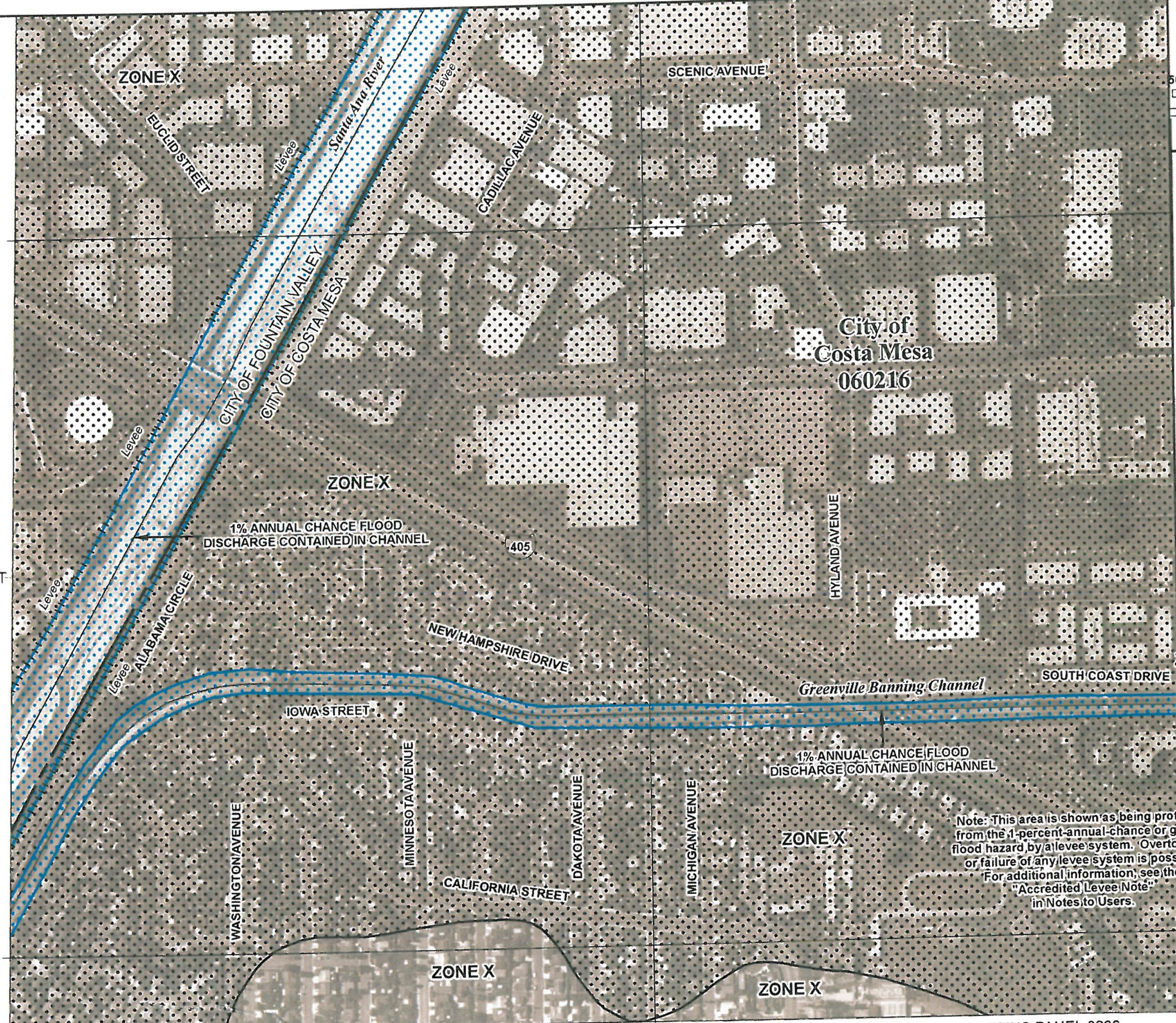
MAP NUMBER
06059C0258J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

GREENVILLE BANNING CHANNEL

ional Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METERS

NFIP

PANEL 0258J

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 258 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COSTA MESA, CITY OF	060216	0258	J
FOUNTAIN VALLEY, CITY OF	060218	0258	J
SANTA ANA, CITY OF	060232	0259	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0258J

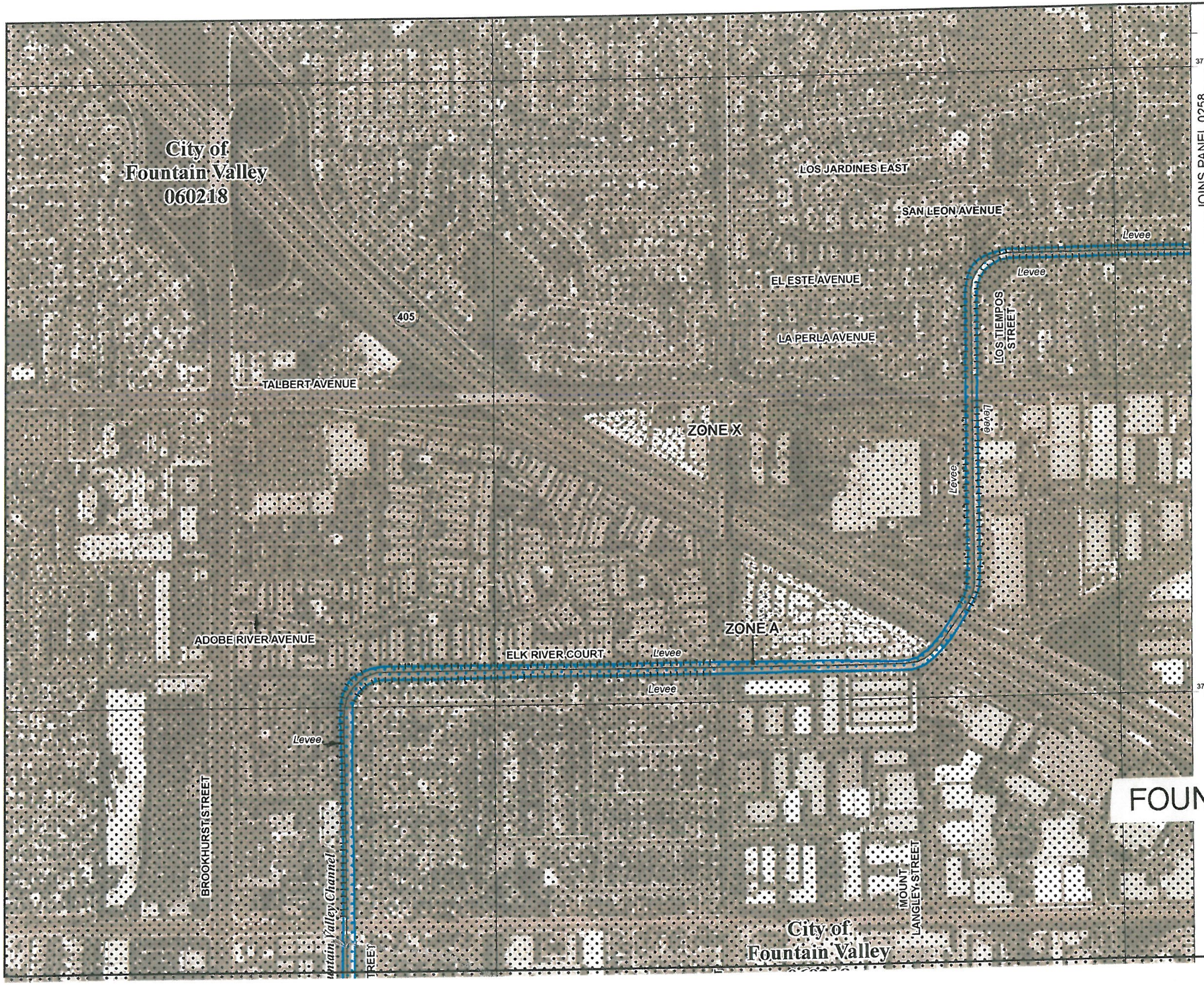
MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

SANTA ANA RIVER

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

onal Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0254J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 254 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COSTA MESA, CITY OF	060216	0254	J
FOUNTAIN VALLEY, CITY OF	060218	0254	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0254J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

FOUNTAIN VALLEY CHANNEL

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

117°58'07.5"
07.5"

6040000 FT

JOINS PANEL 0252

6045000 FT

ional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000

FEET

METERS

DAISY AVENUE

MARIPOSA AVENUE

Ocean V

EMMONS CIRCLE

Ocean View Channel

ZONE A

WINTHROP CIRCLE

ZONE X

ZONE A

BUTTONWOOD STREET

BROOKHURST STREET

LA ESTRELLA AVENUE

405

BUSHARD STREET

SLATER AVENUE

LIMIT OF STUDY

Talbert Channel (D02)

ZONE X

ZONE A

FT

PANEL 0254J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 254 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COSTA MESA, CITY OF	060216	0254	J
FOUNTAIN VALLEY, CITY OF	060218	0254	J

Notice to User. The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0254J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

NFIP

OCEAN VIEW CHANNEL

1 OF 2

JOINS PANEL 0251

6035000 FT

117°58'07.5"

33°43'07.5"

ZONE X

Note: This area shown is being protected from the 1-percent-annual-chance flood hazard by a levee system. Overtopping or failure of any levee system is possible. For additional information, see the "Accredited Levee Note" in Notes to Users.

ZONE A

ZONE A

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL

Ocean View Channel

RECREATION CIRCLE

37°31'000"N

EL RANCHO AVENUE

BLAYLOCK DRIVE

City of Fountain Valley 060218

SANTA CLARA STREET

FRIESLAND DRIVE

ZONE X

SANTA SUZANNE STREET

LA LUNA AVENUE

LA ZANA COURT

SLATER AVENUE

CAMERON STREET

37°30'000"N

tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000

FEET

METERS

PANEL 0253J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 253 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FOUNTAIN VALLEY, CITY OF	060218	0253	J
HUNTINGTON BEACH, CITY OF	060034	0253	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 06059C0253J

MAP REVISED DECEMBER 3, 2009

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

OCEAN VIEW CHANNEL

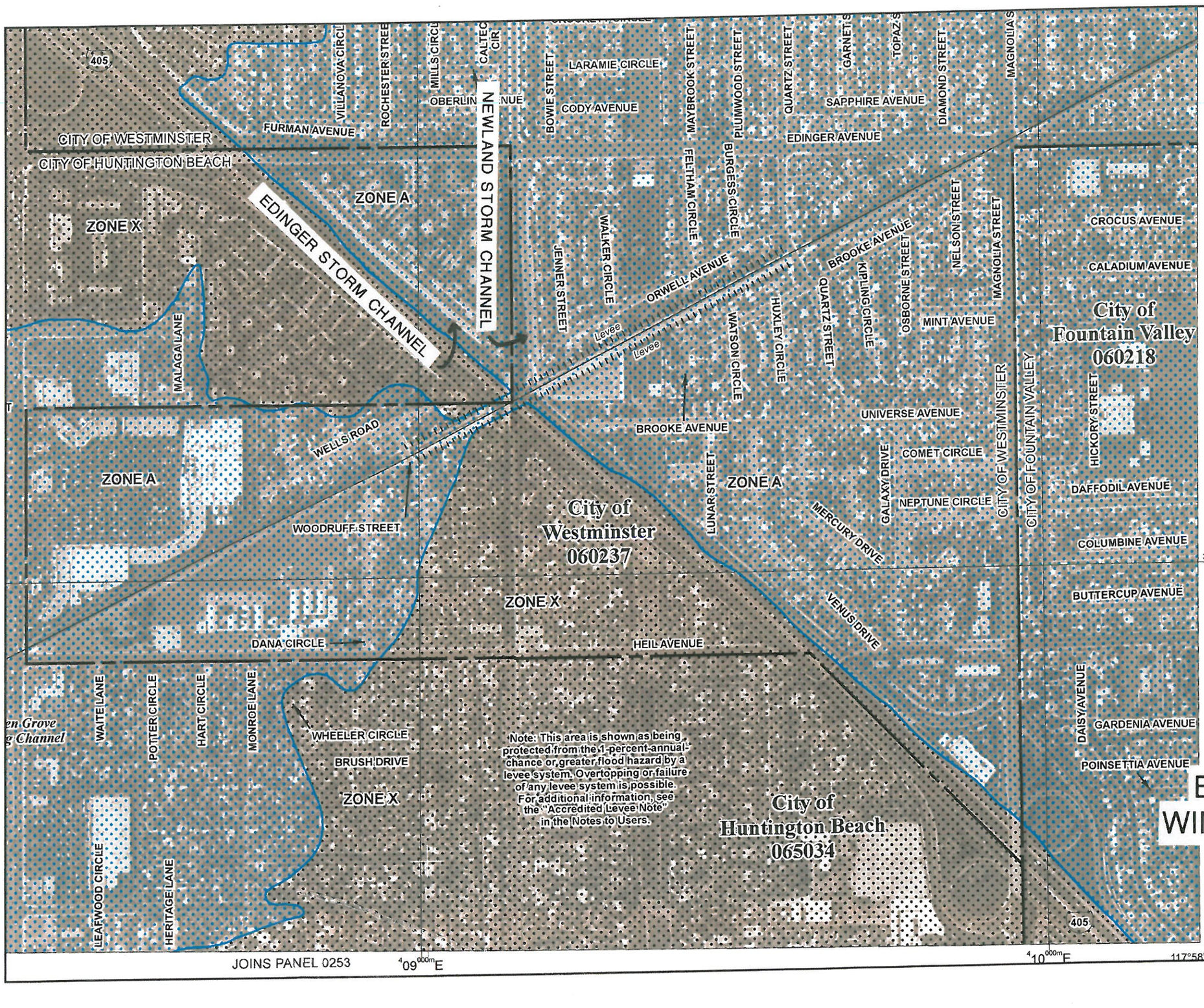
2 OF 2

tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS



PANEL 0251J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 251 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FOUNTAIN VALLEY, CITY OF	060218	0251	J
HUNTINGTON BEACH, CITY OF	065031	0251	J
ORANGE COUNTY	060212	0251	J
WESTMINSTER, CITY OF	060737	0251	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 06059C0251J

MAP REVISED DECEMBER 3, 2009

Federal Emergency Management Agency

NFIP NATIONAL FLOOD INSURANCE PROGRAM

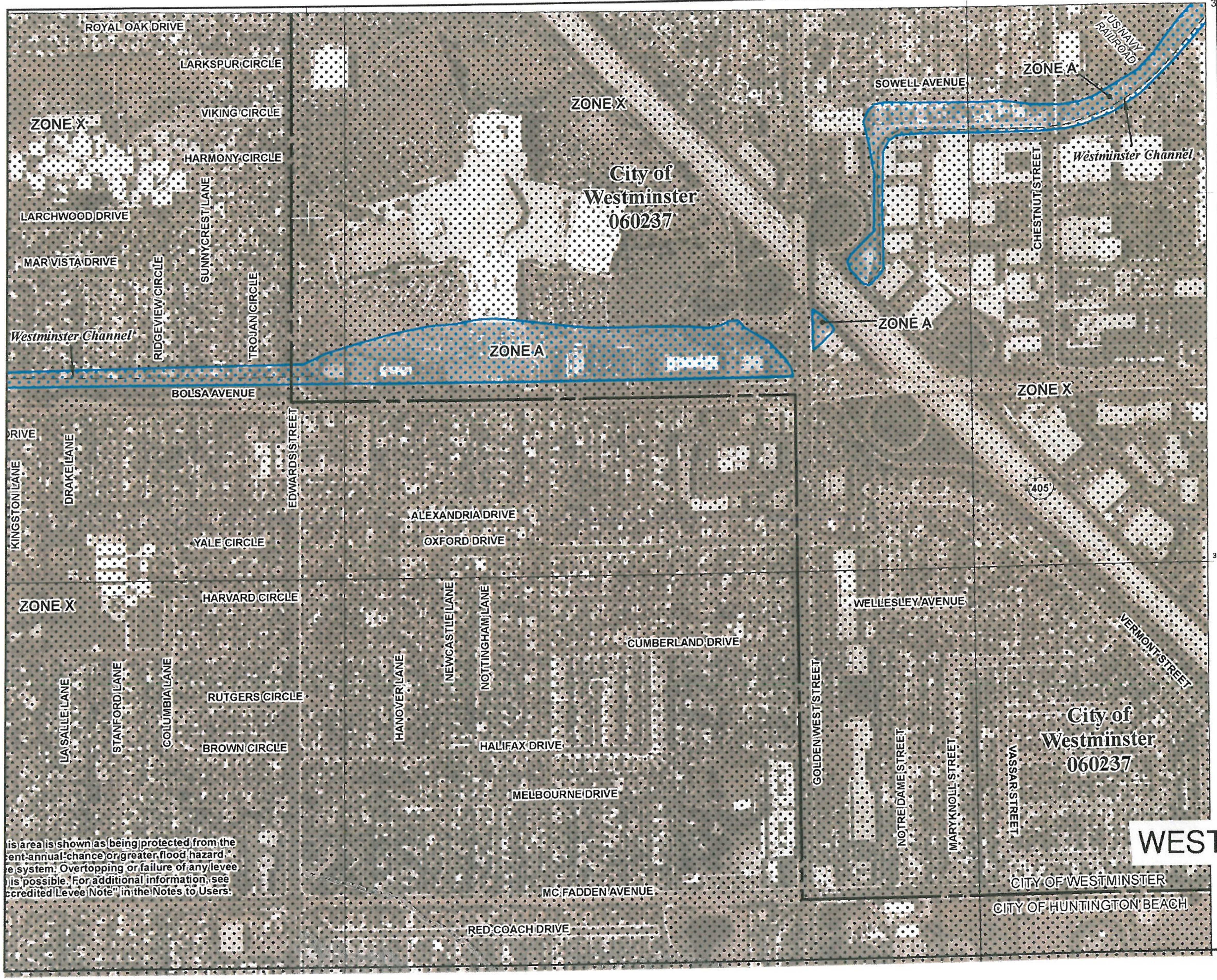
EAST GARDEN GROVE WINTERSBURG CHANNEL

EDINGER CHANNEL

NEWLAND CHANNEL

Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

...tional Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS

NFIP

PANEL 0232J

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 232 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HUNTINGTON BEACH, CITY OF	065034	0232	J
WESTMINSTER, CITY OF	060237	0232	J

Notice to User: The Map Number shown below should be used when placing map orders, the Community Number shown above should be used on insurance applications for the subject community.

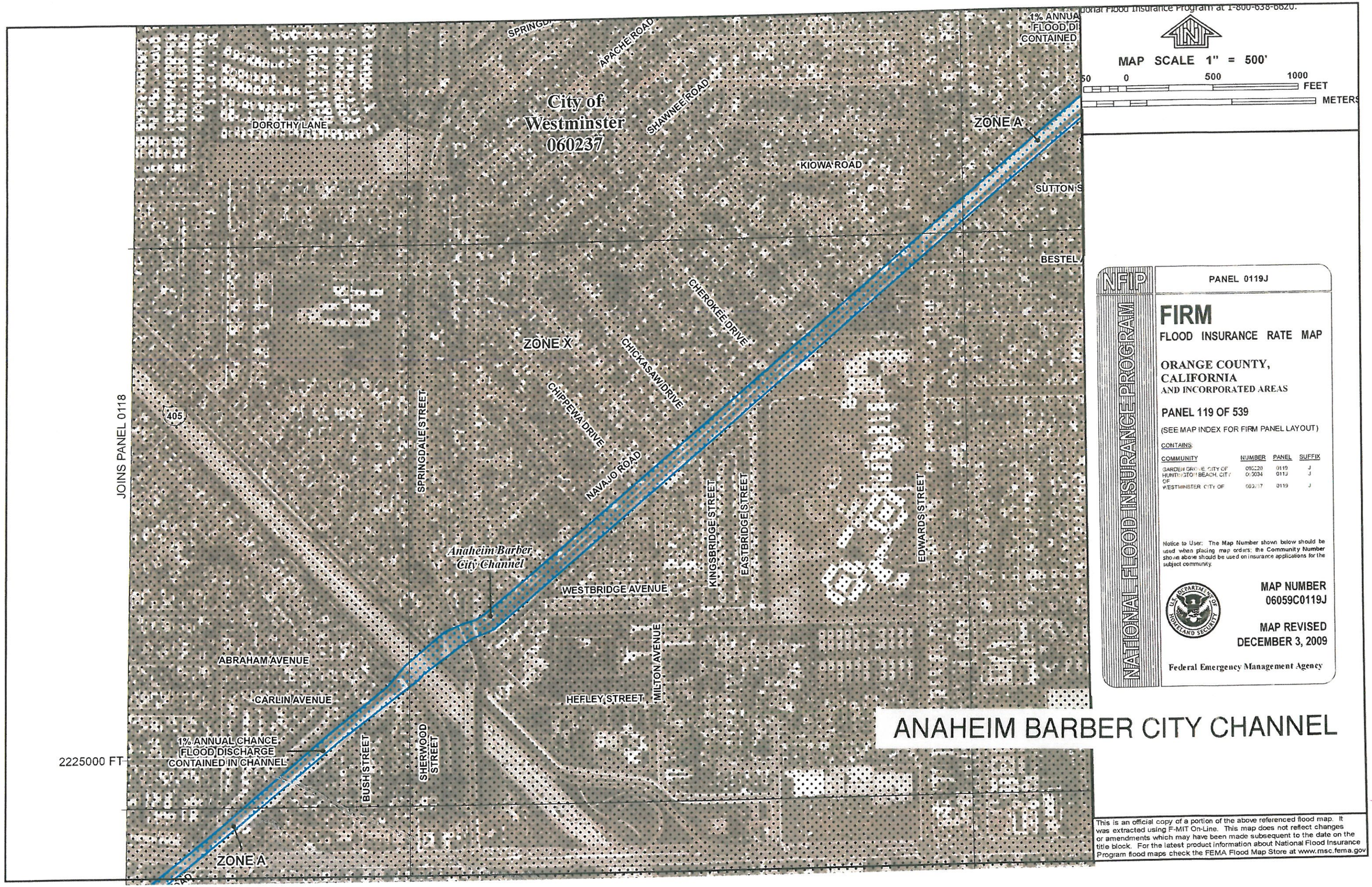
MAP NUMBER
06059C0232J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

WESTMINSTER CHANNEL

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



ional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS

PANEL 0119J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 119 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GARDEN GROVE, CITY OF	060220	0119	J
HUNTINGTON BEACH, CITY OF	060034	0119	J
WESTMINSTER, CITY OF	060237	0119	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0119J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

NFIP NATIONAL FLOOD INSURANCE PROGRAM

ANAHEIM BARBER CITY CHANNEL

6015000 FT JOINS PANEL 0116

Golf Course Retarding Basin

ZONE X

ZONE AE
(EL 14)

IRONWOOD AVENUE

HAZELNUT AVENUE

GUAVA AVENUE

LAMPSON AVENUE

FIR AVENUE

City of
Seal Beach
060233

ELDER AVENUE

DOGWOOD AVENUE

ZONE X

ASTER STREET

CANDLEBERRY AVENUE

BIRCHWOOD AVENUE

ALMOND AVENUE

405

DY0650

DY0649

DY0647

DY0646

DY0651

DY0648

DY0645

Note: This area is shown as being protected from the 1-percent-annual-chance or greater flood hazard by a levee system that has been provisionally accredited. Overtopping or failure is possible. For additional information, see the "Provisionally Accredited Levee Note" in Notes to Users.

ZONE D AND MILITARY BOUNDARIES COINCIDENT WITH CORPORATE LIMITS

ZONE D

IRONWOOD AVENUE

HAZELNUT AVENUE

GUAVA AVENUE

WISTERIA STREET

ZONE A

DOGWOOD AVENUE

Bolsa Chica Channel

CANDLEBERRY AVENUE

VIOLET STREET

405

Orange County
Unincorporated Areas
060212

LIMIT OF STUDY

LIMIT OF STUDY

BOLSA CHICA CHANNEL

...ional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0118J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 118 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GARDEN GROVE, CITY OF	060230	0118	J
HUNTINGTON BEACH, CITY OF	025034	0118	J
ORANGE COUNTY	060212	0118	J
SEAL BEACH, CITY OF	060233	0118	J
WESTMINSTER, CITY OF	060237	0118	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0118J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS

ZONE X

DY0814

City of Seal Beach 060233

ZONE AE (EL 14)

ZONE X

RO DRIVE

ZONE X

Note: This area is shown as being protected from the 1-percent-annual-chance or greater flood hazard by a levee system that has been provisionally accredited. Overtopping or failure of any levee system is possible. For additional information, see the "Provisionally Accredited Levee Note" in the Notes to Users.

LIMIT OF STUDY

reas

FOSTER ROAD

YELLOWTAIL DRIVE

SEAL BEACH BOULEVARD

LAMPSON AVENUE

ZONE AE (EL 14)

Golf Course Retarding Basin

ZONE X

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL

DY0816

DY0653

405

DY0607

DY0606

DY0654

DY0815

DY0656

DY0652

DY0655

FEDERAL STORM CHANNEL

ZONE D

Orange County Unincorporated Areas 060212

DY0658

DY0657

FEDERAL STORM CHANNEL

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0114J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 114 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ORANGE COUNTY	060212	0114	J
SEAL BEACH, CITY OF	060233	0114	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 06059C0114J

MAP REVISED DECEMBER 3, 2009

Federal Emergency Management Agency

6005000 FT

JOINS PANEL 0112

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL

ZONE X

CITY OF SEAL BEACH

ORANGE COUNTY

Montecito Storm Channel

COPA DE ORO DRIVE

COLLEGE PARK DRIVE

Orange County
Unincorporated Areas
060212

Note: This area is shown as being protected from the 1-percent-annual-chance or greater flood hazard by a levee system that has been provisionally accredited. Overtopping or failure of any levee system is possible. For additional information, see the "Provisionally Accredited Levee Note" in the Notes to Users.

MARTHA ANN DRIVE

FOSTER ROAD

YELLOWTAIL DRIVE

ZONE X

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL

DY0816

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL

Bixby Storm Channel

ZONE A

DY0611

DY0607

DY0606

DY0815

DY0612

405

DY0656

DY0610

City of
Seal Beach
060233

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL

ZONE X

DY0658

DY0657

MONTECITO STORM CHANNEL

BIXBY STORM CHANNEL

...tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0114J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 114 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ORANGE COUNTY	060212	0114	J
SEAL BEACH, CITY OF	060233	0114	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0114J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

APPENDIX B

PHOTOS

Montecito Storm Channel

Photo Date: July 23, 2009

Direction: Picture taken facing southwest, from east of I-405.

Bixby Storm Channel

Photo Date: July 29, 2009

Direction: Picture taken facing south and east of I-405

Bixby Storm Channel

Photo Date: August 4, 2009

Direction: Picture taken facing west and north of I-405.

Federal Storm Channel

Photo Date: Google 2009

Direction: Picture taken facing northeast from south of I-405.

Federal Storm Channel

Photo Date: July 23, 2009

Direction: Picture taken facing east from south of I-405.

Bolsa Chica Channel

Photo Date: April 28, 2010

Direction: Picture taken facing North, from south of I-405.

Milan Storm Drain

Photo Date: April 28, 2010

Direction: Picture taken facing north, from south of I-405.

Anaheim Barber Channel

Photo Date: July 23, 2009

Direction: Picture taken facing southwest, from north of I-405.

Westminster Channel

Photo Date: July 27, 2009

Direction: Picture taken facing Northeast (Northwest of the intersection Bolsa Ave/Goldenwest St.)

Edinger Storm Channel

Photo Date: August 4, 2009

Direction: Picture taken facing southeast, from north of I-405.

Newland Storm Channel

Photo Date: August 4, 2009

Direction: Picture taken facing south, from north of I-405.

Newland Storm Channel

Photo Date: April 28, 2010

Direction: Picture taken facing north, from north of I-405.

East Garden Grove Wintersburg Channel

Photo Date: August 4, 2009

Direction: Picture taken facing southeast, north of I-405.

East Garden Grove Wintersburg Channel

Photo Date: August 4, 2009

Direction: Picture taken facing northeast, south of I-405.

Ocean View Channel

Photo Date: July 28, 2009

Direction: Picture taken facing southeast, from north of I-405.

Fountain Valley Channel

Photo Date: July 28, 2009

Direction: Picture taken facing southwest, from south of I-405.

Santa Ana River

Photo Date: July 29, 2009

Direction: Picture taken facing northwest, from north of I-405. Drains from northeast to southwest and towards the Pacific Ocean.